CLAIMS

1. An electrical machine comprising:

a magnetically permeable core, the core being elongated to thereby define a lengthwise direction and a profile that is transverse to the lengthwise direction; and

coils that are wound about the core profile and sequentially disposed along the lengthwise direction;

the core profile having a surface that is bowed outward.

2. The electrical machine of claim 1 further comprising an axis of rotation, and wherein the elongated core is arcuate about the axis, such that the coils are toroidally wound about the core and sequentially disposed about the axis.

3. The electrical machine of claim 1 further comprising an axis of rotation, and wherein the elongated core is ring-shaped and centered on the axis, such that the coils are toroidally wound about the core and sequentially disposed about the axis.

4. The electrical machine of claim 1 further comprising a cavity extending lengthwise through the core and also comprising two ports extending from the cavity to outside the core.

5. The electrical machine of claim 1 wherein the core comprises a first section that is resistant to eddy currents that would circulate along only either of two opposite faces of the first section, and also has a second section that is resistant to eddy currents that would circulate along any face of the second section.

6. The electrical machine of claim 1 further comprising an elongated magnet that is parallel with the core and that has a magnet profile that overhangs the core profile.

7. The electrical machine of claim 1 wherein the core profile is surrounded on three sides by a magnet.

8. The electrical machine of claim 7 wherein the core profile is surrounded on four sides by a magnet.

9. The electrical machine of claim 7 wherein the magnet is a one-piece structure.

10. The electrical machine of claim 1 further comprising an elongated magnet that is parallel with the core and that has a magnet profile of which a surface is bowed inwardly, the inwardly-bowed surface of the magnet being adjacent and facing the outwardly-bowed surface of the core.

11. The electrical machine of claim 10 wherein a spacing between the magnet and the core is uniform along at least a portion of the outwardly-bowed surface of the core profile.

12. The electrical machine of claim 10 wherein the magnet is magnetized such that each flux line is generally perpendicular to the section of the magnet surface that the flux line intersects.

13. The electrical machine of claim 1 wherein at least one of the coils consists essentially of a single layer of turns of wire.

14. The electrical machine of claim 1 wherein at least one of the coils is formed of rectangular wire.

15. The electrical machine of claim 1 further comprising coil-free spaces between adjacent coils, and further comprising brackets installed about the coil-free spaces, the brackets configured to provide a flat peripheral surface defined by the peripheral surfaces of the coils and the brackets.

16. The electrical machine of claim 15 wherein the bracket is magnetically-permeable.

17. The electrical machine of claim 15 wherein the bracket is non-magnetically-permeable.

18. The electrical machine of claim 1 further comprising a second core identical to and parallel with the first core, and still further comprising three identical elongated magnets that are parallel with the cores, the cores being interspersed between the magnets.

19. An electrical machine comprising:

a magnetically permeable core, the core being elongated to thereby define a lengthwise direction and a profile that is transverse to the lengthwise direction;

coils that are wound about the core profile and sequentially disposed along the lengthwise direction; and

an elongated magnet that is parallel with the core and that has a magnet profile that overhangs the core profile.

20. An electrical machine comprising:

a magnetically permeable core, the core being elongated to thereby define a lengthwise direction and a profile that is transverse to the lengthwise direction; and

coils that are wound about the core profile and sequentially disposed along the lengthwise direction;

the core profile being surrounded on three sides by a magnet.